REMARKS

The Examiner is thanked for the comments in the Action. They have helped us considerably in understanding the Action and in drafting this Response thereto.

It is our understanding that claims 1-13 remain pending in this application, wherein claims 1 and 8 have been amended for reasons specifically remarked upon, below, and claims 6-7 have been canceled as redundant.

Preliminary items:

We respectfully ask entry of the following amendments to correct errors which were noted in preparing this Response. No new subject matter is added by these amendments.

In [0046] "to" is changed to "is."

In [0071] "point on point on" is changed to "point on"

In FIG. 4 the element labeled "Laser" is now marked with reference 102 and the reference 220 is now changed to 110, in both cases to confirm with the text of the specification.

In FIG. 5 the reference for the central horizontal line is changed from 152 to 156, to confirm with the text of the specification, and the instance of reference 152 below the central horizontal line is deleted as redundant.

In FIG. 6b an extraneous reference 152 is removed and the font size of reference 194 and the text near it is increased.

And in FIG. 8 a reference 314 is added.

Item 1 (§ 102(e) rejections):

Claim 1 is rejected as being anticipated by Cliche. Responsive to this Applicant has amended claim 1 by moving the subject matter of claims 6 and 7 into it. Since claims 6 and 7 are not rejected under § 102(e), we urge that this addresses and moots the present rejection of claim 1 (other issues regarding the subject matter of claims 6 and 7 are addressed below).

Furthermore, in view of this, claims 6 and 7 are cancelled as redundant and claim 8, which depended from claim 7, is now amended to instead depend directly from claim 1.

Item 2 (§ 103(a) rejections, 1/2):

Claims 2-8, 10, 12, and 13 are rejected as being unpatentable (obvious) over Cliche in view of Green. Responsive to this Applicant has amended independent claim 1, so that dependent claims 2-5 and 8 are effected, and Applicant traverses with respect to amended claim 1 and with respect to claims 10, 12, and 13.

Turning first to claims 2-8, claims 6-7 are herein cancelled and claims 1-5 and 8 depend from claim 1. As noted already, claim 1 has been amended by incorporation into it if the subject matter of claims 6-7. Applicant respectfully urges that claims 2-5 and 8 now avoid the present rejection for at least the following reasons.

The Action states "*With respect to claim 6* [and now applicable to all of claims 1-5 and 8-9]*, Cliche discloses wherein said controller (34) is further suitable to controllably provide said etalon tuning signal (18) (see fig. 2A).*" However, this is clearly error. Element 18 of Cliche is a "*primary light beam*," i.e., a laser light beam (see e.g., [0069] and FIG. 2A).

Perhaps the Examiner meant to say "*signal (38)*," but that also does not support the rejection. Element 38 of Cliche is a "*laser control signal 38*" (see e.g., [0074] and FIG. 2A) and that is not based on any signal from photodetector (42). Rather, it is based on a signal from considerable other apparatus in Cliche that has no equivalent in Applicant's claims. Furthermore, this laser control signal (38) is based on an absolute reference, and is not used to tune (verses to stabilize).

Continuing, with respect to claim 6 and thus now applicable to all of claims 1-5 and 8-9 as well, the Action states:

> *The thermal unit maintains said FP etalon at or changes said FP etalon to a specific temperature, thereby setting said paired reflectors to a corresponding separation where the FP etalon has a corresponding resonant frequency is well taught by Green (see col. 13, lines 26-30 and col. 10, lines 3-5).*

However, the cited portions of Green do not support the assertions made here – and, in fact, actually serve to distinguish the present invention in claims 1-5 and 8-9 from Green.

At col. 13, ln. 24-31 (the entire paragraph) Green states:

> *From a default configuration, where the laser frequency is selected at the wavelength of overlap between the two etalons, the laser can be tuned. As the temperature of the second etalon is changed, it's free-spectral range will change. Given enough change in FSR2, the overlap wavelength will "snap" by FSR1, and a new laser frequency will be selected. One can select FSR1=50 GHz, for*

> *example, which corresponds to approximately 2 mm of BK7 glass.* (emphasis added)

So here we see that Green teaches two etalons, yet Applicant's invention recited in claims 1-5 and 8-9 uses only one etalon. This in and of itself distinguishes over Green, if for no other reason than that present claims 1-5 and 8-9 are a patentable (less elements) improvement over Green (or any putative combination of it with Cliche).

Next, all the cite above to col. 13, ln. 26-30 supports is that changing the temperature of one etalon in Green will "snap" its laser to a different FSR on the ITU grid (e.g., by a 50 GHz increment). This cannot be reconciled with present claims 1-5 and 8-9, which recite controllably generating a tuning signal so the thermal unit maintains a FP etalon at or changes it to a specific temperature.

More generally, however, it appears that the principle of operation of Applicant's invention has been overlooked. Rather than select or snap between FSR increments in a grid, the present invention moves a "lock point" as desired while the wavelength of a laser tunably follows that lock point. As can be appreciated by reference to Applicant's FIG. 5 (depicting this principle), this is quite different than what is taught or reasonably suggested by Cliche, Green, or their combination. [The label "lock point" has long been used in the art to denote a fixed point (as discussed in the specification at [0008] and shown in FIG. 3). In contrast, however, the present invention intentionally moves such a "lock point." In the context of the present invention it might be helpful to think of this as a "tracking point." As can be seen in the confusion in the present Action, "lock" evokes static-ness and stabilization – whereas the present invention employs controlled dynamic-ness and tuning.]

Continuing, alternately stated, what is quoted above from Green is not "tuning," but rather picking, selecting, switching, snapping, etc. between discreet increments of wavelength. In contrast, the invention recited in claims 1-5 and 8-9 truly "tunes" across a range of wavelengths. To say that Green is equivalent to the invention in claims 1-5 and 8-9 would thus be analogous to saying that digital is equivalent to analog.

Similarly, all the cite above to col. 10, ln. 3-5 in Green supports is that the silicon in a grid generator or channel selector can be heated or cooled – to select or snap to a grid or channel.

Continuing, only now with respect to claim 7 and thus also applicable to all of claims 1-5 and 8-9 as well, the Action states "*Cliche and Green disclose everything as claimed above. In addition, Cliche discloses a controller (34) is further suitable to select a lock point with respect*

to the transmitted intensity of the laser beam (28) detected by said photodetector (30) (see fig. 2A and paragraph 0074)." However, FIG. 2A and [0074] simply do not support this. For example, [0074] states:

> *... the reference filter beam 28 outputted by the absolute reference filter 26 is used to lock the frequency of the tunable laser source 16 relative to a selected absorption feature of the absolute reference filter 26. ... In a preferred embodiment, the controller selects the correct absorption feature of the absolute reference filter to lock the laser and establish a servo loop to lock the laser on that feature. To do that, the controller 34 may induce a dithering of the frequency of the tunable laser source 16, extract a corresponding error signal from the reference filter signal and use this error signal to close the loop. ... It will be noted that operating this set-up continuously allows not only to maintain the laser frequency fixed, but also fixed at a known calibrated value.*

A key point about Cliche that apparently has been overlooked is what its element 26 is. Cliche teaches an "*absolute reference filter 26 having a transmission spectrum which includes at least one absolutely known absorption feature*" ([0071]). This is the opposite of an etalon in operation. An etalon does not absorb a specific narrow spectrum, it passes one. Consistent with this, it is notable that all of Cliche's discussion of its absolute reference filter (26) teaches that it is a cell employing atomic or molecular absorption principles (see e.g., [0072]-[0073]).

In sum, all of these misunderstood aspects of claims 6 and 7 are now incorporated into claims 2-5 and 8 (by virtue of their depending from now amended claim 1), and in view of neither Cliche, Green, or their combination teaching or reasonably suggesting these limitations we respectfully urge that claims 2-5 and 8 now be allowed.

Turning now to claim 10, the Action here states that "*Cliche discloses ... a tunable etalon assembly (14) including a Fabry-perot ("FP") etalon (26).*" However, this is error. As noted above, Cliche's element 26 is an "*absolute reference filter 26 having a transmission spectrum which includes at least one absolutely known absorption feature*" ([0071]). Again, this is the opposite of an etalon in operation.

Furthermore, it appears that Cliche's element 14 has generally been misunderstood. It is actually a "*filter stabilizing assembly 14*" (see e.g., [0065]). This is important because stabilization and tuning are not equivalent – stabilization entails preventing change and tuning is the controlled use of change. Cliche teaches stabilization and claim 10 is directed to determining the tuned change in a wavelength.

Continuing again now with the text of the Action, it here also states that Cliche discloses "*a coupler suitable to alternately receive and redirect either of said second beam portion and the second laser beam as a tuning beam portion (see paragraph 0070).*" However, claim 10 does not recite anything like this.

The Action here further states that Cliche discloses "*a controller (34) suitable to: generate said etalon tuning signal (32).*" However, this is also error. Cliche's element 32 is a "*proportional electronic reference filter signal 32*" (see e.g., [0074]), and it is not generated by its controller (34). Rather, it is an input received into the controller (34), and it is a laser stabilizing signal – not an "*etalon tuning signal.*"

The Action here also further states that Cliche discloses that its controller (34) is additionally suitable to "*receive said detected signal and generate a laser tuning signal based thereon (see fig. 2A and paragraphs 0071 and 0074).*" However, Cliche's "*laser control signal 38*" is presumably what was meant here and it is stabilized, not tuned (see e.g.,[0074] and FIG. 2A).

The Action here next states (opines) that the just argued aspects of Cliche are for "*thereby facilitating controllably tuning the wavelength of the laser beam emitted by the tunable laser (16) (see fig. 2A).*" However, one should recall that the apparatus taught by Cliche merely facilitates stabilizing its "*tunable laser 16.*" What is overlooked here is that a tunable laser can be controllably stabilized to a set wavelength (what Cliche does) or controllably tuned to a desired wavelength (what Applicant's claim 10 does with determination of the amount of change).

Continuing, the Action next states that Cliche discloses that its controller (34) is also suitable to "*receive said second detected signal (44) and counts peak valley cycles therein.*" However, there is no support for this in Cliche (and the Action notable fails to cite any).

And next the Action here states (opines) that the just argued aspects of Cliche are for "*thereby facilitating determination of how much the wavelength of the laser beam emitted by the tunable laser has been tuned (see paragraph 0018).*" However, [0018] in Cliche is merely a portion of a Background Art comment about a prior art reference (Chung), not Cliche. And Chung deals with mode selection, not tuning in the manner of present claim 10. Furthermore, Chung teaches a two-laser approach that cannot be reconciled with Cliche or claim 10. Respectfully if the Examiner wants to use Chung in a rejection he needs to cite it, and then Applicant will argue responsively.

Finally, here the Action states that "*It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the two references above ....*" However, as we have shown above, numerous elements that the individual references that are relied upon to support the rejection are not taught or reasonably suggested by the references. Accordingly, it should now be clear that the references when combined do not teach or reasonably suggest all the limitations of claim 10 and that this determinative requirement of a prima facie case for obviousness is not met (and with these references cannot be met).

Turning now to claim 12, the Action here states that "*Cliche discloses ... a coupler suitable to alternately receive and redirect either of said second beam portion and the second laser beam as a tuning beam portion (see paragraph 0070).*" However, this is error. [0070] merely teaches that a fiber coupler may be used as the first beamsplitter (20) and [0070], and FIG. 2A which it discusses, do not teach a coupler in addition to the first beamsplitter (20). Furthermore, there is nothing except the FP etalon (12) in the path of Cliche's "*second light beam*" (68, 70).

The Action next states that Cliche discloses "*a first Fabry-perot ("FP") etalon (26) suitable to receive and wavelength filter said first beam portion (see fig. 2A and paragraph 0074).*" However, as discussed above with regard to claim 10, Cliche's element 26 is not an FP etalon and it does not function in the manner of such.

The Action here also states that Cliche discloses "*a controller (34)* [to] *receive said first detected signal (32) and generate a first tuning signal based thereon to tune the first tunable laser to emit the first laser beam at a specific known wavelength (see fig. 2A and paragraphs 0071 and 0074).*" Firstly, Applicant agrees with the assessment here in the Action that Cliche's element 32 is received rather than generated by element 34 (this apparently being misunderstood and having been wrongly argued at numerous other places in the Action). However, this then illustrates how Cliche does not support the present rejection. What here in Cliche is the first tuning signal to tune the first laser? Is it "*laser control signal 38*"? If so, that is used for stabilization, not tuning (see e.g., [0074] and FIG. 2A).

The Action next states that Cliche discloses that its controller (34) is also to "*control said first tuning signal (22) to servo lock the first laser beam to said known wavelength (see fig. 2A and paragraph 0074).*" However, this is clear error. Cliche's element 22 is a beam portion, and it

is nowhere controlled by its controller (34). Furthermore, this "*first light beam 22*" is apparently not directly "controlled" in any manner (see e.g., [0070] and FIG. 2A).

The Action goes on to state that Cliche discloses that its controller (34) is also to "*generate said etalon tuning signal such that said tuning detected signal is at a known point on a peak-valley curve for said tuning FP etalon (see fig. 5B and paragraph 0013* [SIC, 113?]*).*" However, this is illogical. The only thing that plausibly is an "*etalon tuning signal*" here in Cliche is its "*periodic filter tuning signal 39*" that comes from its "*periodic filter stabilization means 48*," and [0113] makes it clear that all that is being done here is stabilizing a "*peak 64*" for an outside system (an optical spectrum analyzer) to be calibrated against. This is not "tuning."

The Action next states that Cliche discloses that its controller (34) is also to "*record a first value for said etalon tuning signal when said tuning beam portion comes from the first laser beam (22) and said tuning detected signal (32) is at said known point (see paragraph 0074).*" Respectfully, this is unsupported speculation, conjecture, or 20/20 hindsight based on Applicant's disclosure. The Action cites no support in Cliche for "recording" anything.

Similarly, the Action next states that Cliche discloses that its controller (34) is also to "*record a second value for said etalon tuning signal when said tuning beam portion comes beam from the second laser (see paragraph 0075).*" And this is also unsupported speculation because the Action cites no support in Cliche for "recording" anything.

And similarly, the Action next states that Cliche discloses that its controller (34) is also to "*generate said etalon tuning signal such that said second value matches said first value.*" And here as well the Action provides merely unsupported speculation, citing nothing in Cliche to support the assertion.

Continuing, the Action here next states (opines) that the just argued aspects of Cliche are for "*thereby tuning said tunable etalon across the difference in wavelengths of the first and second from the second tunable lasers (see paragraph 0018).*" However, Cliche teaches stabilization, not tuning. Cliche clearly is not using wavelength differences between its two beams (18, 68). And as discussed at length above (with respect to claim 10), in Cliche [0018] is a Background Art comment about a prior art reference (Chung) – not Cliche. Chung deals with mode selection, not tuning in the manner of present claim 12. Chung teaches a two-laser approach based on specific lines of Krypton and maximizing power output of two lasers – clearly using a totally different principle of operation and achieving a different goal than either of Cliche

or Applicant's invention. Respectfully, if the Examiner wants to use this Chung in a rejection he needs to cite it, and then Applicant will argue responsively.

The Action here next states (opines) that these aspects of Cliche are also to "*report on said first and second tuned values via an output link, thereby providing information about the difference said known wavelength emitted by said first tunable laser and wavelength emitted by said second tunable laser (see paragraph 0084).*" However, nothing whatsoever in [0084] is about reporting anything or reasonably suggests an output link used to do so.

Finally, here the Action states that "*It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the two references above ....*" However, as we have shown above, numerous elements of the individual references that are relied upon to support the rejection are not taught or reasonably suggested by the references. Accordingly, it should now be clear that the references when combined do not teach or reasonably suggest all the limitations of claim 12 and that this determinative requirement of a prima facie case for obviousness is not met.

Turning now to claim 13, we first urge that this claim should be allowable under at least the same rationale as stated above for parent claim 12. Additionally, we urge that the arguments stated in the Action are error.

The Action here states that "*Cliche discloses a second beamsplitter (54) suitable to receive and split the second laser beam (40) into third and fourth beam portions (see fig. 5A), wherein said third beam portion is received by the coupler.*" However, if this is so then what is the second laser producing the second laser beam in Cliche? If this is the "*broadband source 60*" producing the "*user light beam 50*" in FIG. 5a, then in Cliche that is received by "*combiner 52*" rather than "*beam splitter 54.*" Additionally, what Cliche teaches (especially in FIGS. 4A and 5A) also cannot be reconciled with claim 13 because nothing out of the beamsplitter (54) of Cliche is received into anything equivalent to a coupler.

The Action next states (with respect to Cliche) "*see paragraph 0070, which stated that the beam splitting device (20) (in fig. 2A) may be embodied in a plurality of manners, such as a beam splitter, or a fiber coupler: a second FP etalon (12) suitable to receive and wavelength filter said fourth beam portion (see fig. 5).*" However, this says nothing that one skilled in the art

would understand as changing the number and ordering, and purpose of multiple elements in Cliche in a manner that would read on claim 13.

The Action next states that Cliche discloses "*a second photodetector suitable to receive said fourth beam portion after filtering and generate a second detected signal based on transmitted intensity (see fig. 5A).*" However, nothing in Cliche teaches or reasonably suggest (especially not in FIGS. 4A and 5A) a photodetector (which the Action notably fails to identify with any specificity) that receives a beam portion output by a beamsplitter that has received it from a second laser (i.e., what claim 13 recites).

And similarly, the Action next states that Cliche discloses that "*said controller* [is] *further suitable to receive said second detected signal and controllably generate a second tuning signal based thereon to servo lock the second tunable laser to emit the second laser beam at a specific wavelength (see fig. 5A and paragraphs 0074 and 0075).*" But again, nothing in Cliche teaches or reasonably suggests a second tunable laser. If its "*broadband source 60*" is somehow being mistaken for such, that is just that – a mistake. This can be appreciated by reference to FIGS. 4A-b and 5A and [0113] of Cliche.

Item 3 (§ 103(a) rejections, 2/2):

Claims 9 and 11 are rejected as being unpatentable (obvious) over Cliche in view of Green and Kner. Respectfully this is error.

As has been shown above with respect to claim 1 (now amended) and claim 10, Cliche and Green fail to teach or reasonably suggest numerous limitations of these parent claims that are relied upon to support the rejections of claims 9 and 11.

Within the statements of the Action here all that is argued about Kner is that "*A tunable etalon assembly further includes a temperature sensor suitable to provide a temperature signal is well taught by Kner (see paragraph 0014).*" Accordingly, even assuming that this is correct and relevant, Kner is not argued to (and does not) teach or reasonably suggest the critical elements that Cliche and Green fail to teach or suggest. It follows that Cliche, Green, and Kner when combined also do not teach or reasonably suggest all the limitations of claims 9 or 11, and that this determinative requirement of a prima facie case for obviousness is not met.

Furthermore, [0014] of Kner has apparently been misunderstood. In relevant portion this merely states that "*A wavelength tuning member and a temperature sensor are coupled to the*

laser." This does not state that the temperature sensor is included in an FP etalon – as claims 9 and 11 recite. In fact, by looking at FIGS. 2-3 and especially FIG 4A of Kner it should be clear that this is not the case. And from [0041] of Kner it can be appreciated that its temperature sensor (16) is being used to detect the temperature of its semiconductor laser (12), rather than anything related to an etalon separate from a laser that the etalon is being used to tune (claim 9) or to verify the tuning (claim 11) of a laser. Note also that present claims 9 and 11 do not include a laser – they are tools to use with a laser.

Yet furthermore, the Action states:

> *Cliche and Green disclose that the controller is further suitable to receive and employ said temperature signal when generating said etalon tuning signal (see Cliche, paragraph 0097). ... Cliche and Green fail to specifically disclose a tunable etalon assembly further includes a temperature sensor suitable to provide a temperature signal.*

But this begs the question: If Cliche and Green fail to disclose a temperature detecting means, how then can a controller in them receive and employ a temperature signal?

Item 4 (Conclusion):

This appears informational in nature and is understood to require no reply.

CONCLUSION

Applicant has endeavored to put this case into complete condition for allowance. It is thought that the §102 rejection is addressed by amendment and that the §103 rejections have also been addressed by amendment or have been completely rebutted. Applicant therefore asks that all objections and rejections now be withdrawn and that allowance of all claims presently in the case be granted.

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